

AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. **(Currently Amended)** A transceiver comprising:
 - a signal power source adapted to produce ~~[[a]]~~ an outgoing physical layer signal for transmission across a physical link
 - an on transceiver high-speed data modulator that is coupled to the signal power source wherein the signal power source is configured to modulate the outgoing ~~[[a]]~~ physical layer signal with a high-speed data signal received from the high-speed data modulator;
 - an out-of-band data modulator that is coupled to the signal power source wherein the signal power source is configured to modulate the outgoing physical layer signal in response to out-of-band data received from the out-of-band data modulator wherein modulation by the signal power source in response to the high-speed data and out-of-bound data provided by the high-speed data modulator and out-of-band data modulator produces ~~[[an]]~~ a outgoing double modulated signal as the outgoing physical layer signal including high-speed data and out-of-band data; and
 - a controller configured to generate diagnostic information regarding the transceiver and~~[[/or]]~~ to receive diagnostic information from a host device externally coupled to the transceiver over a standard bus, the controller further configured to provide the controller generated and host generated diagnostic information to the out-of-band modulator to be modulated as at least some of the out-of band data.

2. **(Original)** The transceiver of claim 1, wherein:
 the transceiver is an optical transceiver;
 the signal power source comprises a laser driver and laser; and
 the transceiver further comprises an average power bias circuit configured to control the average power output by the laser, wherein the out-of-band data modulator is coupled to the average power bias circuit.

3. **(Original)** The transceiver of claim 1, wherein:
 the transceiver is an optical transceiver;
 the signal power source comprises a laser driver and laser; and
 the laser driver further comprises an extinction ratio command input configured to control the extinction ratio of a signal output by the laser, wherein the out-of-band data modulator is coupled to the extinction ratio command input.

4. **(Original)** The transceiver of claim 1, wherein:
 the transceiver is an optical transceiver;
 the signal power source comprises a laser driver and laser;
 the transceiver further comprises an average power bias circuit configured to control the average power output by the laser, wherein the out-of-band data modulator is coupled to the average power bias circuit; and
 the laser driver further comprises an extinction ratio command input configured to control the extinction ratio of a signal output by the laser, wherein the out-of-band data modulator is coupled to the extinction ratio command input.

5. **(Original)** The transceiver of claim 1, wherein:
 the transceiver is an optical transceiver;
 the signal power source comprises a laser driver and laser; and
 the laser driver further comprises high-speed data 1 level command that defines the power output by the laser when a high-speed data 1 is output, wherein the out-of-band data modulator is coupled to the high-speed data 1 level command.

6. **(Original)** The transceiver of claim 1, wherein the out-of-band modulator is configured to modulate using at least one of phase shift keying, binary phase shift keying, quadrature phase shift keying, and Manchester encoding.

7. **(Original)** The transceiver of claim 1, wherein the out-of-band data modulator is configured to modulate identification and authentication information.

8. **(Original)** The transceiver of claim 1, wherein the out-of-band data modulator is configured to modulate diagnostic information including the health of the transceiver.

9. **(Original)** The transceiver of claim 1, wherein the out-of-band data modulator is configured to modulate configuration data.

10. **(Currently Amended)** The transceiver of claim 1 further comprising:
- a signal reception element configured to receive an incoming physical layer signal[[s]] from a second physical link and to produce an incoming double modulated signal from the physical layer signal;
 - an out-of-band detector that is coupled to the signal reception element and is configured to extract out-of-band data from the incoming double modulated signal;
 - a processor configured to receive and provide the extracted diagnostic and/or configuration data to the host device over the standard bus; and
 - a high-speed data amplifier that is coupled to the signal reception element and is configured to extract high-speed data from the incoming double modulated signal and provide the high-speed data to the externally coupled host device.

11. **(Original)** The transceiver of claim 10, wherein the out-of-band detector comprises an IR receiver.

12. **(Currently Amended)** In an environment including a host device ~~an optical transceiver in communication with a remote optical transceiver via a local optical transceiver, the host device being external to both the local and remote optical transceivers and in communication with a host device,~~ a method of transmitting data on a physical link comprising:

receiving high speed data at the local optical transceiver from the host device via a first bidirectional interface;

~~modulating, at the local optical transceiver, a data signal with high-speed data; wherein the optical transceiver transmits high-speed data to the host device over a high-speed data interface;~~

receiving low speed data at the local optical transceiver from the host device via a second bidirectional interface;

~~modulating, at the local optical transceiver, the data signal with out-of-band data including the low speed data, wherein modulating the data signal with the high-speed data and the out-of-band data creates an outgoing double modulated signal that is a physical layer signal for transmission on a physical link, wherein the out-of-band data is data transmitted by the transceiver over the high speed data interface to the remote transceiver for the use of the local optical transceiver and the remote optical transceiver in diagnostic operations and wherein out-of-band data is transmitted by the transceiver to the host device over a low speed data interface;~~

~~transmitting, at the local optical transceiver, the double modulated signal to the remote optical transceiver on [[onto]]the physical link,~~

wherein the first bidirectional interface is a high speed data interface and the second bidirectional interface is a low speed data interface.

13. **(Original)** The method of claim 12, wherein modulating the modulated data signal comprises varying the average power the physical layer signal.

14. **(Original)** The method of claim 12, wherein modulating the modulated data signal comprises varying the peak power of the physical layer signal.

15. **(Original)** The method of claim 12, wherein modulating the modulated data signal comprises varying the extinction ratio of the physical layer signal.

16. **(Currently Amended)** The method of claim 12, further comprising:
receiving at the local optical transceiver an incoming double modulated signal from the remote optical transceiver that includes high-speed and out-of-band data;
extracting high-speed data from the incoming double modulated signal; and
extracting out-of-band data from the incoming double modulated signal.

17. **(Original)** The method of claim 16, wherein extracting out-of-band data from the incoming double modulated signal comprises measuring average power of the incoming double modulated signal.

18. **(Original)** The method of claim 16, wherein extracting out-of-band data from the incoming double modulated signal comprises measuring peak power of the incoming double modulated signal.

19. **(Original)** The method of claim 16, wherein extracting out-of-band data from the incoming double modulated signal comprises measuring the extinction ratio of the incoming double modulated signal.

20. **(Original)** The method of claim 12, wherein modulating the modulated data signal comprises modulating the modulated data signal according to at least one of phase shift keying, binary phase shift keying, quadrature phase shift keying, and Manchester encoding.

21. **(Previously Presented)** A repeater for receiving and retransmitting digital data, the repeater comprising:

a receiver adapted to receive a data signal;

a signal processor coupled to the receiver, the signal processor being adapted to perform processing tasks on the data signal;

a transmitter coupled to the signal processor, the transmitter adapted to receive the data signal from the processor and to transmit the data signal; and

out-of-band logic coupled to the signal processor, the out-of-band logic configured to extract and insert out-of-band data onto the data signal, wherein the out-of-band logic is configured to:

extract out-of-band data from the data signal, wherein the out-of-band data includes digital diagnostic data from at least one remote repeater;

concatenate data corresponding to digital diagnostic data for the repeater to the out-of-band data such that the out-of-band data includes the digital diagnostic data for the repeater and the at least one remote repeater; and

insert the out-of-band data including the data corresponding to digital diagnostic data for the repeater and the at least one remote repeater onto the data signal.

22. **(Cancelled)**

23. **(Original)** The repeater of claim 21, wherein the out-of-band logic is a microprocessor.

24. **(Currently Amended)** A transceiver comprising:

a signal power source adapted to produce ~~[[a]]~~ an outgoing physical layer signal for transmission across a physical link

an on transceiver high-speed data modulator that is coupled to the signal power source wherein the signal power source is configured to modulate the outgoing ~~[[a]]~~ physical layer signal with a high-speed data signal received from the high-speed data modulator;

an out-of-band data modulator that is coupled to the signal power source wherein the signal power source is configured to modulate the outgoing physical layer signal in response to out-of-band data received from the out-of-band data modulator wherein modulation by the signal power source in response to the high-speed data and out-of-band data provided by the high-speed data modulator and out-of-band data modulator produces ~~[[an]]~~ a outgoing double modulated signal as the outgoing physical layer signal including high-speed data and out-of-band data; and

an average bias circuit configured to control the average output by the signal power source, wherein the out-of-band data modulator is coupled to the average power bias circuit,

the average power bias circuit comprising:

an amplifier having a first input configured to receive an average power command and a second input configured to receive the out-of-band data;

a transistor having a first node coupled to the amplifier, wherein the amplifier controls the operation of the transistor, and a second node coupled to the signal power source.

25. **(Currently Amended)** A transceiver comprising:

a signal power source adapted to produce ~~[[a]]~~ an outgoing physical layer signal for transmission across a physical link

an on transceiver high-speed data modulator that is coupled to the signal power source wherein the signal power source is configured to modulate the outgoing ~~[[a]]~~ physical layer signal with a high-speed data signal received from the high-speed data modulator;

an out-of-band data modulator that is coupled to the signal power source wherein the signal power source is configured to modulate the outgoing physical layer signal in response to out-of-band data received from the out-of-band data modulator wherein modulation by the signal power source in response to the high-speed data and out-of-band data provided by the high-speed data modulator and out-of-band data modulator produces ~~[[an]]~~ a outgoing double modulated signal as the outgoing physical layer signal including high-speed data and out-of-band data; and

the signal power source comprises a laser driver and a laser;

wherein the laser driver further comprises an extinction ratio command input configured to control the extinction ratio of a signal output by the laser, wherein the out-of-band data modulator is coupled to the extinction ratio command input,

the laser driver comprising:

a first node coupled to a mixer, wherein the mixer is configured to receive the extinction ratio command input and is configured to receive the out-of-band data;

a second node configured to receive high-speed data; and

a third node coupled to the laser.